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<p>(21) International Application Number: PCT/SE90/00250 (22) International Filing Date: 12 April 1990 (12.04.90) (30) Priority data: 8901432-8 20 April 1989 (20.04.89) SE (71) Applicant (for all designated States except US): KINBAG AB [SE/SE]; Box 683, S-531 16 Lidköping (SE). (72) Inventor; and (75) Inventor/Applicant (for US only): HALLQVIST, Uno [SE/SE]; Ålyckeatan 3, S-531 41 Lidköping (SE). (74) Agents: ROTH, Michel et al.; Göteborgs Patentbyrå AB, Box 5005, S-402 21 Göteborg (SE).</p>		<p>(81) Designated States: AT (European patent), AU, BE (European patent), CA, CH (European patent), DE (European patent), DK (European patent), ES (European patent), FI, FR (European patent), GB (European patent), IT (European patent), JP, KR, LU (European patent), NL (European patent), NO, SE (European patent), US. Published With international search report.</p>
<p>(54) Title: A PROPULSION UNIT FOR HAND CARTS</p> <p>(57) Abstract</p> <p>A propulsion unit for hand carts, particularly golf carts (10), of the type incorporating at least two spaced apart wheels (16), which are rotatably supported at a wheel undercarriage (11) and between which wheels is provided said propulsion unit (20) incorporating at least one driving wheel (21), which can be driven by a power unit (28). The driving wheel (21) is via a link (22) pivotably suspended in a support (23) in the wheel undercarriage (11), and it is positioned behind the cart wheels (16) as seen in the direction of travel. The axial length of the link (22) and the radial extension of the driving wheel (21) as measured from said support (23) is bigger than the distance from the support to the contact points of the cart wheels against the soil, thus that a torque is obtained when the driving wheel is driven, which torque gives the cart a lifting force.</p>		

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A PROPULSION UNIT FOR HAND CARTS

The present invention refers to a propulsion unit for hand
5 carts, particularly golf carts, of the type incorporating at
least two spaced apart wheels, which are rotatably supported
in a wheel undercarriage and between which wheels is provi-
ded said propulsion unit incorporating at least one driving
wheel, which can be driven by a power unit.

10

BACKGROUND OF THE INVENTION

Detachable propulsion units for golf carts are earlier
known. An example of such an unit is shown by US-A-4 105
15 084, which has the features defined in the preamble of claim
1. These known propulsion units have a drawback in that they
easily will slip and therefore are very inefficient.

It also has been suggested to preload the propulsion unit
20 with a spring pressing the unit against the soil, but this
means that the unit must be made integral with the hand
cart, and that the propulsion unit can not be readily remo-
ved, e.g. when the golf cart shall be used without propul-
sion unit.

25

PURPOSE AND MOST ESSENTIAL FEATURES OF THE INVENTION

The purpose of the present invention is to provide a pro-
pulsion unit of the type mentioned above, which is easily
30 attachable to and detachable from the golf cart, which
efficiently transfers substantially the entire golf cart
weight to the driving wheel, which by a simple hand grip can
be readjusted from a pulling to a pushing propulsion unit,
which is easy to steer in spite of the propulsion unit, and
35 which, when dismounted requires but small space. These tasks
have been solved in that the driving wheel via a link is
pivotably suspended in a support in the wheel undercarriage,

that the driving wheel is positioned behind the cart wheels as seen in the direction of travel, and that the axial length of the link and the radial extension of the driving wheel as measured from said support is bigger than the distance from the support to the contact points of the cart wheels against the soil, thus that a torque is obtained when the driving wheel is driven, which torque gives the cart a lifting force.

10 DESCRIPTION OF THE DRAWINGS

The invention hereinafter will be further described with reference to the drawings, which show an embodiment thereof.

15 Fig. 1 shows in perspective the wheel undercarriage of the golf cart with mounted propulsion unit according to the invention.

Fig. 2 shows the golf cart according to Fig. 1 in a side view with the propulsion unit in pulling position.

20 Fig. 3 shows likewise a side view of the golf cart according to Fig. 1 with the propulsion unit in pushing position.

Fig. 4 shows in bigger scale a side view of a snap-in attachment for attachment of the propulsion unit to the wheel undercarriage.

25 Fig. 5 shows a side view of an entire golf cart with propulsion unit according to the invention and a separate joystick positioned at the handle of the cart.

DESCRIPTION OF EMBODIMENT

30 The golf cart shown in the drawing is of the type where the wheels and the wheel undercarriage are retractable into the golf bag, whereas the legs of the wheel undercarriage in extended position are spread apart thus that the golf cart has a straddle-legged support against the soil. This golf cart is further described in EP-A-0 055 873, and therefore only the details which are associated with the propulsion

unit are described hereinafter. It however shall be pointed out that the propulsion unit according to the invention can be applied on most golf carts available on the market having a wheel undercarriage of the same or similar type as that
5 shown in the drawing.

The golf cart shown incorporates thus a wheel undercarriage 11 consisting of an attachment plate 12 for supporting a golf bag 13. The wheel undercarriage 11 incorporates double
10 tie rods 14 and 15, which each together form one leg, which articulatedly supports one cart wheel 16 each. A pair of slewing brackets 17, 18 are pivotably connected to the tie rods 14 and keep the legs of the wheel undercarriage in spread-apart position. A short distance below the slewing
15 brackets 17 and 18 is provided a propulsion unit 20 between the wheels 16, which propulsion unit consists of a driving wheel 21, which by means of a link 22 is articulatedly connected to the tie rods 14 via bearings 23 and a yoke 24. This is supported with both its free ends in one clamping
20 attachment 25 each, each of which clamping attachments with a simple hand grip can be clamped around the associated tie rod 14.

The link 22 of the propulsion unit 20 is shaped as a fork, the driving wheel 21 being journaled between the fork arms
25 26 and 27 thereof. In the upper part of the fork-shaped link 22 is provided a power unit 28 acting upon the propulsion unit and incorporating an electric motor 29, a chargeable accumulator 30 and an electronic unit 31, which via a cable
30 32 is connected to a control handle 33 at the handle 34 of the cart.

In one fork arm 26 of the link 22 is provided a transmission device 35, which in the embodiment shown is a gear belt
35 transmission.

In order to give the golf cart a better steering ability,

the yoke 24 is axially displaceable in the supporting means 36 of the clamping attachments 25 and it is given a length bigger than the distance between the supporting means. The very clamping attachment 25 incorporates a clamping loop 37, which can be snapped over the tie rod 14, which has the shape of a tube 14 of rectangular cross section. The clamping loop may be squeezed with a simple hand grip around the tie rod 14 by means of a clamping fitting 38. As earlier mentioned the supporting means 36 supporting the end portions of the yoke 24, is fitted to the clamping attachment 25, and in order to prevent the driving unit 25 during propulsion of the golf cart from moving past the vertical plane through the centre of the cart wheels 16, at least on one end portion 39 of the yoke is fitted an axially displaceable, but non-rotatably supported stop member 40 shaped as a sleeve, to which is attached a tenon 41 allowing the propulsion unit 20 to pivot in a direction away from the soil, but preventing it from being pivoted to the opposite side of the cart wheels. In Figs 1, 2 and 6 the propulsion unit is positioned thus that a pulling force is obtained in the handle 34 of the golf cart. Sometimes it may be desirable that the golf cart is driven with a pushing force, and this can easily be effected with the propulsion unit 20 according to the invention in that this is turned around 180°, such as shown in Fig. 3. Sometimes it may also be desirable to disconnect the propulsion unit without this being removed from the cart and for this purpose a hook 42 is attached to the wheel undercarriage 11, which hook can be hooked into a ring 43 at the upper side of the propulsion unit, thus that the driving wheel 21 will be situated at some distance above the soil such as intimated with dash-dot-lines in Fig. 3.

The invention is not limited to the embodiment described and shown but a plurality of variants are possible within the scope of the appended claims.

CLAIMS

1. A propulsion unit for hand carts, particularly golf carts (10), of the type incorporating at least two spaced apart wheels (16), which are rotatably supported at a wheel undercarriage (11) and between which wheels is provided said propulsion unit (20) incorporating at least one driving wheel (21), which can be driven by a power unit (28),
c h a r a c t e r i z e d t h e r e b y
10 that the driving wheel (21) via a link (22) is pivotably suspended in a support (23) in the wheel undercarriage (11), that the driving wheel (21) is positioned behind the cart wheels (16) as seen in the direction of travel, and that the axial length of the link (22) and the radial
15 extension of the driving wheel (21) as measured from said support (23) is bigger than the distance from the support to the contact points of the cart wheels against the soil, thus that a torque is obtained when the driving wheel is driven, which torque gives the cart a lifting force.
20
2. A propulsion unit as claimed in claim 1,
c h a r a c t e r i z e d t h e r e i n,
that the propulsion unit is attachable in a position in front of or behind the cart wheels (16), and
25 that a stop member (40) is provided to prevent the centre of the propulsion unit (20) from passing a vertical plane extending through the centre of the cart wheels.
3. A propulsion unit as claimed in claim 1,
30 c h a r a c t e r i z e d t h e r e i n,
that the propulsion unit is pivotably supported in a yoke (24), which at both its free ends is provided with one attachment (25) each for detachable clamping around one leg (14) each of the wheel undercarriage (11).

FIG. 1

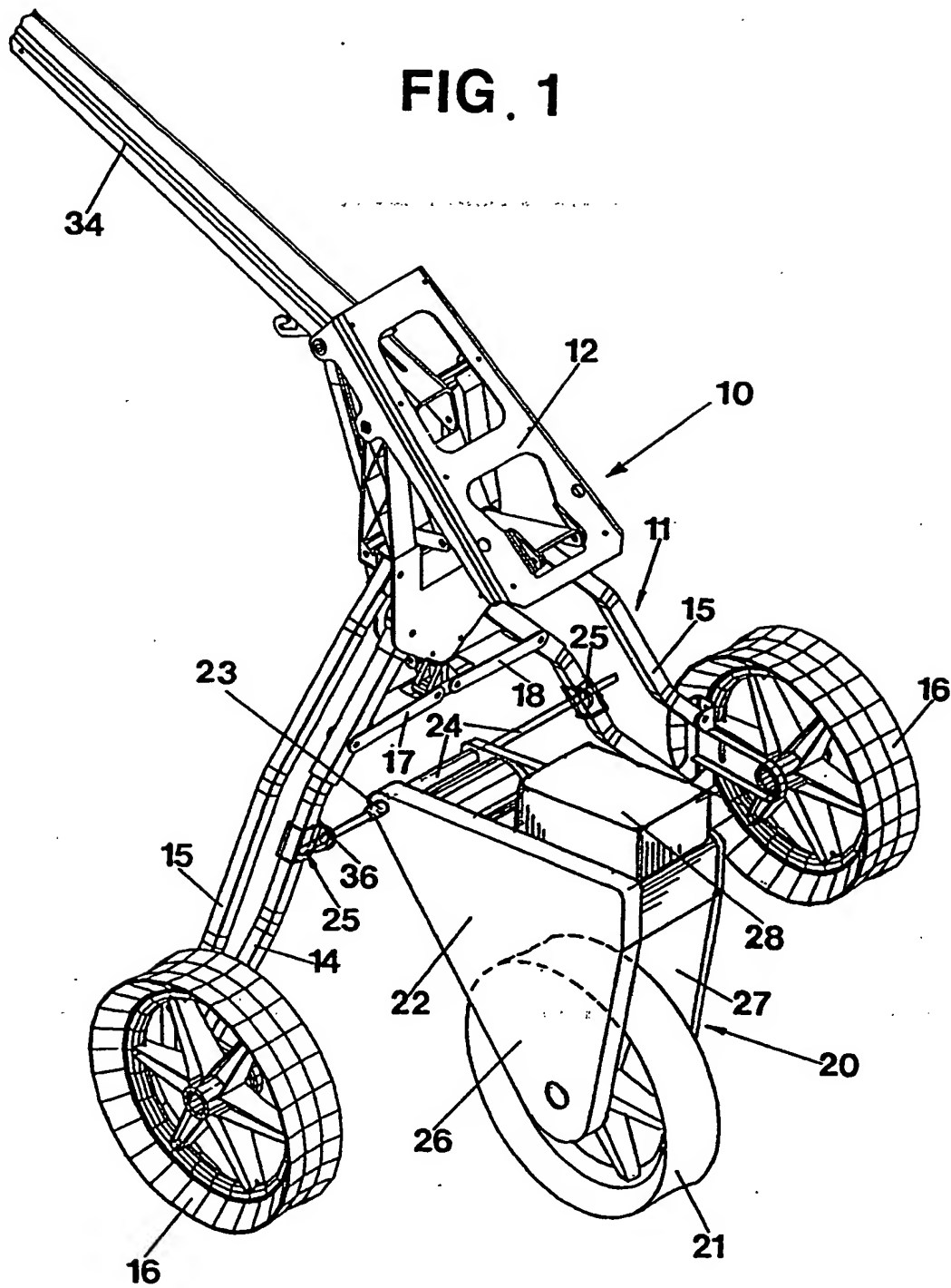


FIG. 3

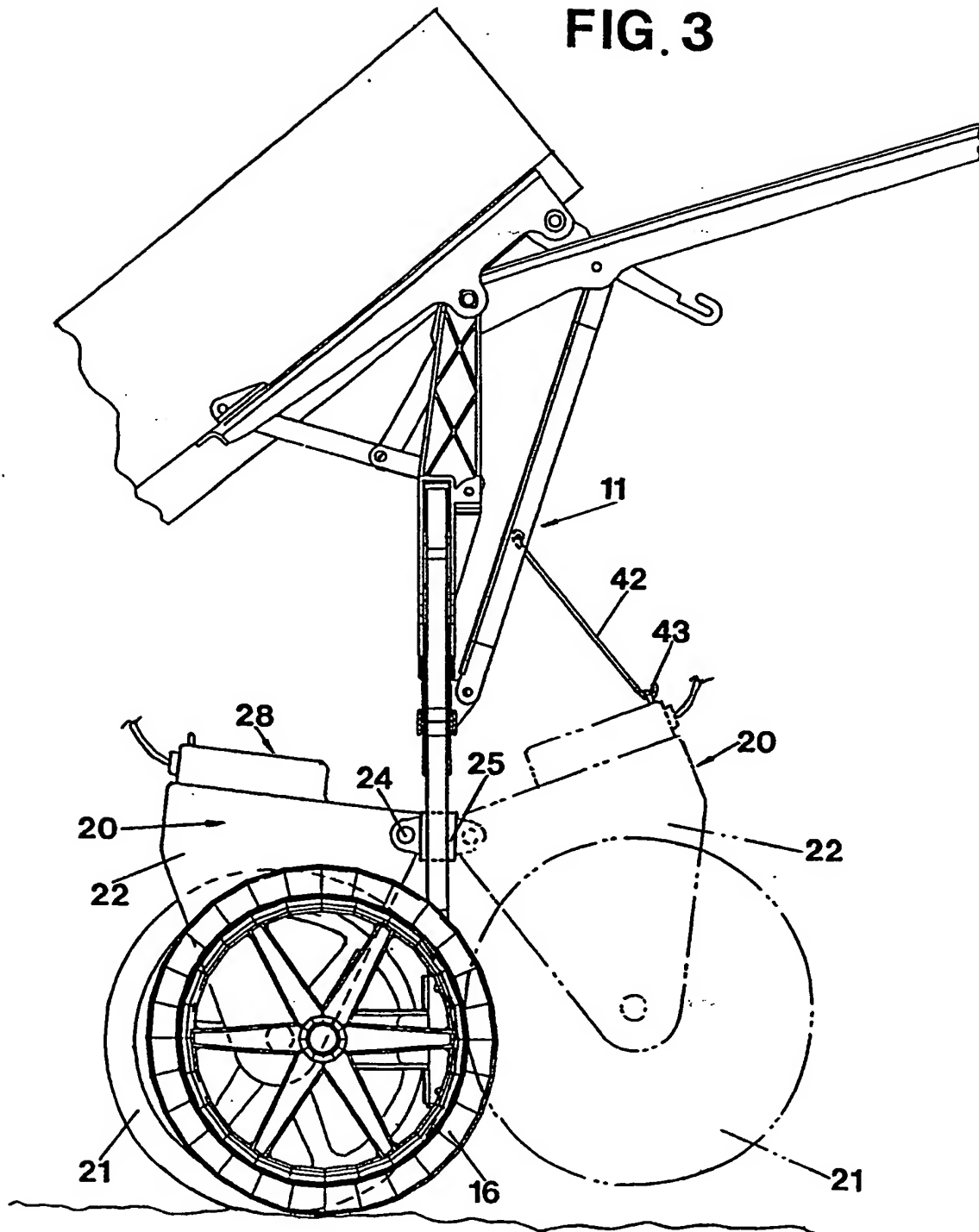


FIG 4

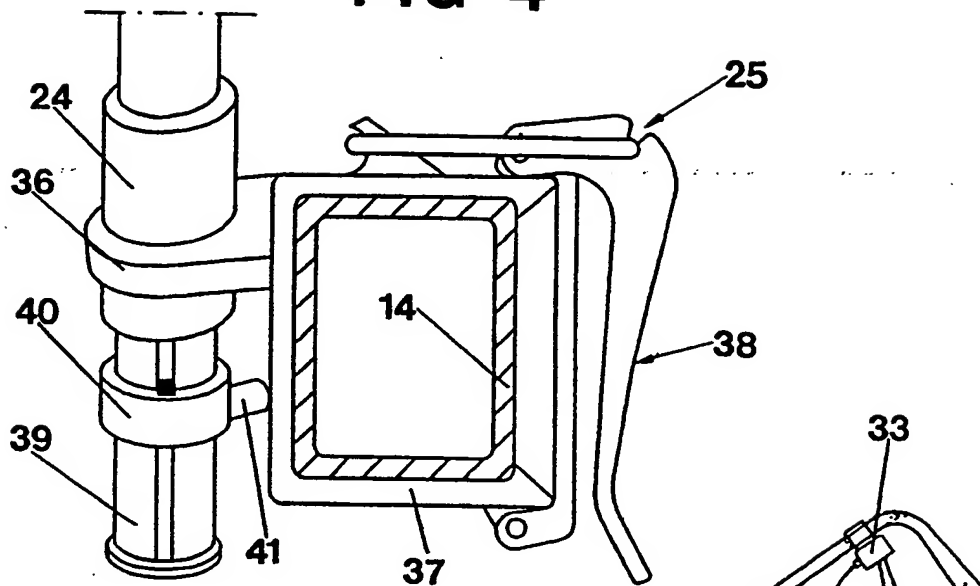
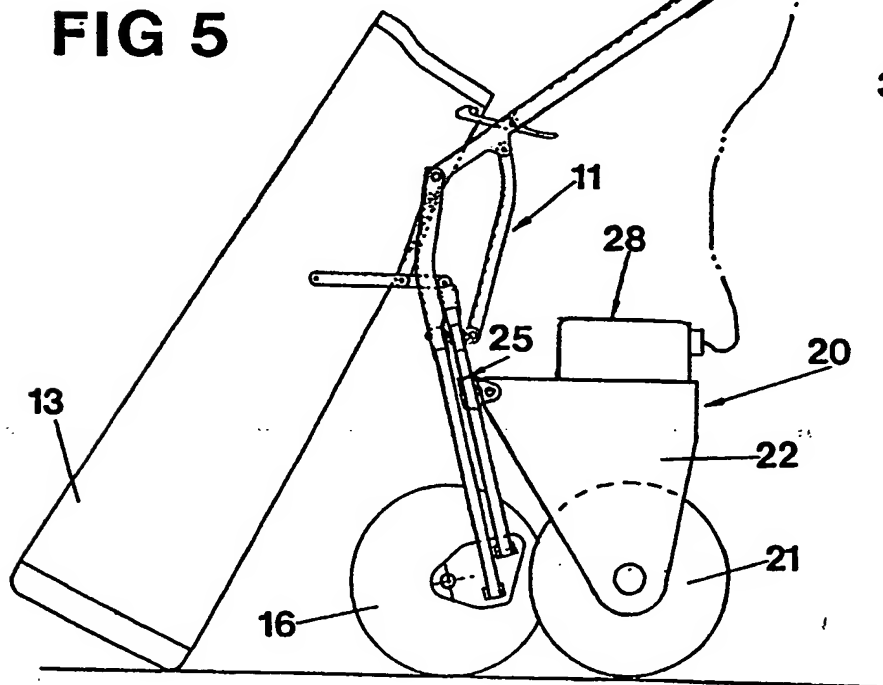


FIG 5



INTERNATIONAL SEARCH REPORT

International Application No PCT/SE 90/00250

I. CLASSIFICATION OF SUBJECT MATTER (if several classification symbols apply, indicate all) ⁶ According to International Patent Classification (IPC) or to both National Classification and IPC IPC5: A 63 B 55/08														
II. FIELDS SEARCHED <div style="text-align: center; margin-top: 10px;">Minimum Documentation Searched⁷</div> <table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 30%; padding: 5px;">Classification System</td> <td style="padding: 5px;">Classification Symbols</td> </tr> <tr> <td style="padding: 5px;">IPC5</td> <td style="padding: 5px;">A 63 B; B 62 D</td> </tr> </table> <div style="text-align: center; margin-top: 10px;">Documentation Searched other than Minimum Documentation to the Extent that such Documents are Included in Fields Searched⁸</div>			Classification System	Classification Symbols	IPC5	A 63 B; B 62 D								
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SE,DK,FI,NO classes as above														
III. DOCUMENTS CONSIDERED TO BE RELEVANT⁹ <table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th style="width: 10%; padding: 5px;">Category</th> <th style="width: 60%; padding: 5px;">Citation of Document,¹¹ with indication, where appropriate, of the relevant passages¹²</th> <th style="width: 30%; padding: 5px;">Relevant to Claim No.¹³</th> </tr> </thead> <tbody> <tr> <td style="text-align: center; vertical-align: top; padding: 5px;">A</td> <td style="padding: 5px;">US, A, 633283 (DISSOSWAY, C.M.) 19 September 1899, see the whole document --</td> <td rowspan="4"></td> </tr> <tr> <td style="text-align: center; vertical-align: top; padding: 5px;">A</td> <td style="padding: 5px;">US, A, 3407892 (VOSSELLER, A.B.) 29 October 1968, see the whole document --</td> </tr> <tr> <td style="text-align: center; vertical-align: top; padding: 5px;">A</td> <td style="padding: 5px;">US, A, 3561555 (CARMICHAEL, J.W.) 9 February 1969, see the whole document --</td> </tr> <tr> <td style="text-align: center; vertical-align: top; padding: 5px;">A</td> <td style="padding: 5px;">US, A, 3948332 (TYNER, R.A.) 6 April 1976, see the whole document --</td> </tr> </tbody> </table>			Category	Citation of Document, ¹¹ with indication, where appropriate, of the relevant passages ¹²	Relevant to Claim No. ¹³	A	US, A, 633283 (DISSOSWAY, C.M.) 19 September 1899, see the whole document --		A	US, A, 3407892 (VOSSELLER, A.B.) 29 October 1968, see the whole document --	A	US, A, 3561555 (CARMICHAEL, J.W.) 9 February 1969, see the whole document --	A	US, A, 3948332 (TYNER, R.A.) 6 April 1976, see the whole document --
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<div style="display: flex; justify-content: space-between;"> <div style="width: 45%;"> <p>¹⁰ Special categories of cited documents:</p> <p>"A" document defining the general state of the art which is not considered to be of particular relevance</p> <p>"E" earlier document but published on or after the international filing date</p> <p>"L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)</p> <p>"O" document referring to an oral disclosure, use, exhibition or other means</p> <p>"P" document published prior to the international filing date but later than the priority date claimed</p> </div> <div style="width: 45%;"> <p>"T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention</p> <p>"X" document of particular relevance, the claimed invention cannot be considered novel or cannot be considered to involve an inventive step</p> <p>"Y" document of particular relevance, the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art.</p> <p>"A" document member of the same patent family</p> </div> </div>														
IV. CERTIFICATION <table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 50%; padding: 5px;"> Date of the Actual Completion of the International Search 17th July 1990 </td> <td style="width: 50%; padding: 5px;"> Date of Mailing of this International Search Report 1990 -07- 2 0 </td> </tr> <tr> <td style="padding: 5px;"> International Searching Authority <div style="text-align: center; margin-top: 10px;">SWEDISH PATENT OFFICE</div> </td> <td style="padding: 5px;"> Signature of Authorized Officer <div style="text-align: center; margin-top: 10px;"> Christer Bäcknert </div> </td> </tr> </table>			Date of the Actual Completion of the International Search 17th July 1990	Date of Mailing of this International Search Report 1990 -07- 2 0	International Searching Authority <div style="text-align: center; margin-top: 10px;">SWEDISH PATENT OFFICE</div>	Signature of Authorized Officer <div style="text-align: center; margin-top: 10px;"> Christer Bäcknert </div>								
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III. DOCUMENTS CONSIDERED TO BE RELEVANT (CONTINUED FROM THE SECOND SHEET)		
Category *	Citation of Document, with indication, where appropriate, of the relevant passages	Relevant to Claim No
A	US, A, 4105084 (BAAK, A.E.) 8 August 1978, see the whole document --	
A	US, A, 4570731 (OAKS, D.) 18 February 1986, see the whole document -- -----	

ANNEX TO THE INTERNATIONAL SEARCH REPORT
ON INTERNATIONAL PATENT APPLICATION NO.PCT/SE 90/00250

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Patent document cited in search report	Publication date	Patent family member(s)	Publication date
US-A- 3407892	68-10-29	NONE	
US-A- 3561555	69-02-09	NONE	
US-A- 3948332	76-04-06	NONE	
US-A- 4105084	78-08-08	NONE	
US-A- 4570731	86-02-18	NONE	